

CLAIMS

1. A fuel cell-atmospheric-pressure turbine hybrid system comprising:

a combustor for burning an exhaust gas discharged from an atmospheric-pressure, high-temperature fuel cell;

a turbine in which a combustion gas discharged from the combustor expands and the pressure of the combustion gas drops to a negative pressure;

a compressor for compressing an exhaust gas discharged from the turbine to increase the pressure of the exhaust gas; and

a heat exchanger for transferring heat from the high-temperature exhaust gas discharged from the turbine to low-temperature air to be supplied to the fuel cell.

2. The fuel cell-atmospheric-pressure turbine hybrid system according to claim 1, wherein the exhaust gas discharged from the compressor is mixed in the air to be supplied to the fuel cell.

3. The fuel cell-atmospheric-pressure turbine hybrid system according to claim 1 further comprising a cooling device disposed below the heat exchanger to cool an exhaust gas discharged from the heat exchanger.

4. The fuel cell-atmospheric-pressure turbine hybrid system according to claim 1 further comprising a second compressor disposed coaxially with the compressor to compress the exhaust gas discharged from the compressor, and a second cooler for cooling the exhaust gas to be supplied to the second compressor.

5. The fuel cell-atmospheric-pressure turbine hybrid system according to claim 1 further comprising an evaporator capable of recovering heat from the exhaust gas discharged from the turbine and generating steam by the recovered heat, and a reforming device for reforming the fuel by using steam generated by the evaporator and supplying the reformed fuel to the fuel cell.

6. The fuel cell-atmospheric-pressure turbine hybrid

system according to claim 1 characterized by an air intake branch line through which part of air to be supplied to the fuel cell is supplied to the combustor.

7. The fuel cell-atmospheric-pressure turbine hybrid system according to claim 1 further comprising a fuel supply device for supplying a fuel other than the cell exhaust gas to the combustor.

8. The fuel cell-atmospheric-pressure turbine hybrid system according to claim 1 further comprising a second turbine capable of burning a fuel and an exhaust gas discharged from the second turbine and of supplying a combustion gas to the first turbine, wherein the exhaust gas discharged from the first turbine is supplied to the heat exchanger.

9. A fuel cell-atmospheric-pressure turbine hybrid system comprising:

a combustor for burning a cell exhaust gas discharged from an atmospheric-pressure, high-temperature fuel cell;

a turbine in which a combustion gas of a pressure substantially equal to the atmospheric pressure discharged from the combustor expands and the pressure of the combustion gas drops to a negative pressure;

a compressor for compressing an exhaust gas discharged from the turbine to increase the pressure of the exhaust gas; and

an air supply line through which air is supplied to the combustor.

10. The fuel cell-atmospheric-pressure turbine hybrid system according to claim 9 further comprising a heat exchanger for transferring heat of an exhaust gas discharged from the turbine to an exhaust gas discharged from the compressor.

11. The fuel cell-atmospheric-pressure turbine hybrid system according to claim 9 further comprising an air supply branch line branched from the air supply line to supply part of air flowing through the air supply line to the fuel cell.

12. The fuel cell-atmospheric-pressure turbine hybrid

system according to claim 11 further comprising an air distribution valve placed at the joint of the air supply line and the air supply branch line to adjust the distribution of air to the air supply line and the air supply branch line.